

1078. 6. 13 / 1-8
Published for the general Benefit of GREAT-
BRITAIN and the North American Colonies.

A N

ABSTRACT

O F

The most useful Parts of a late TREATISE on
HEMP, translated from the *French* of M.
K *Marcandier*, Magistrate of *Bourges*, and in-
scribed by the Editor at LONDON, to the lau-
dable Society for promoting Arts, Manufac-
tures, &c. Being much recommended to the
Growers and Manufacturers of that valuable
Material, from some modern Discoveries and
Experiments of a Method of Preparation, (not
formerly in Practice) in Order to its various
Applications for the Use of Mankind.

T O G E T H E R

With some Observations upon the Prospect of
singular Advantage which may be derived to
GREAT-BRITAIN and her Colonies from *their*
early adopting the Method prescribed.

To which is added,

Some Account of the Use of the Horse-Chestnut ;

A N D

A PLAN of the *Pennsylvania* Hemp Brake.

B O S T O N :

Printed and Sold by EDES & GILL, in Queen-Street.
MDCCLXVI.

Advertisement.

IN a British Magazine for February last, the following account is stated of the usual production of *Hemp* and *Flax* in Great-Britain and Ireland, and of the importation of those materials, together with lint-feed, linnen cloth, and yarn, into those kingdoms yearly, which account, its thought may be properly inserted here, for the information of the Colonists, and their great encouragement to exert themselves in the production of both *Hemp* and *Flax*.

The value of Hemp & Flax, annually raised, is calculated to be

Not less, in England, than . . .	£ 250 000	
in Scotland, than . . .	190 000	
in Ireland, than . . .	500 000	
	<hr/>	£ 940 000

The Importation of those commodities, from the custom-house entries yearly into,

England, value about -	£ 700 000
Scotland, - - -	120 000
Ireland, value uncertain	- - - -

£ 820,000

The Importation of lintseed, from the Continent, and from America, into Bushels.

England, about 100 000	£ 40 000
Scotland, 60 000	25 000
Ireland, 80 000	34 000

£ 99 000

Of Linnen Cloth and Yarn

from the Continent into

England only of the former,

value about . . . £ 1500 000

The latter, value . . . 200 000

£ 1700 000

£ 2619 000

Besides



Advertisement.

Besides thread, lace, sail cloath, cordage, sacking, &c. amounting in the whole to a very considerable value, yearly imported from the continent, as also a large quantity of linnen, from Scotland, and Ireland, where that useful manufacture has been vastly encreased, of late years, under the patronage of Great-Britain, even to the value of two millions annually, if not more.

We may justly infer from the preceding account of the annual production and importation of Hemp and Flax, in Great-Britain and Ireland, that the increasing inhabitants of these Colonies, will not be able, in any short time, to extend the growth of those materials beyond the growing demand of those kingdoms; and that the *harmony*, lately so happily restored, cannot by any means be more firmly established, than by the assiduous application of the Colonists to such an improvement of their well adapted soils, as may enable them to furnish Great-Britain yearly with a respectable quantity of both Hemp and Flax, which may save an equal value of cash or exchange, usually remitted to *foreigners* for the same; *They* having of late years, with much policy, executed at home many of those fabricks, which were formerly the effect of their commerce with Great-Britain, who in return, has very wisely encreased the quantity of linnen cloth among her own people, and encouraged the growth of the raw materials in her Colonies: to promote which, we apprehend, the discovery and experiments communicated to them in the following Abstract, may greatly tend, as they evidently afford a certain premium, the most naturally productive of such an effect.

If in consequence of further experience among the Colonies, as to the improvement of Hemp, any coarse fabrick should be produced, for the cloathing of some of the laboring people; it would only prove an addition to the planter's ability to purchase and pay for more of the finer cloths, stuffs, and other rich British fabricks, their inclination

Advertisement.

inclination for which has ever been observed at least equal to their capacity, of paying for the same. And we have reason to think, that the danger which the generous British suppliers may be in, from the future conduct of the *Americans*, will proceed rather from too indulgent an extent of credit to *them*, than from *their* backwardness in asking that credit which the most of them must be indulged with, or continue in want of those articles, which they are so fond of.



A N

A B S T R A C T, &c.

THE excellent Treatise on HEMP by Mr. *Marcandier*, of which the most useful and interesting parts are conveyed to the publick in the following sheets, has but very lately made its appearance among us. Some judicious persons who have seen it, and the effects of divers experiments in the preparation of Hemp, agreeable to the method prescribed, have manifested their opinion, that a Re-publication might afford singular encouragement to the Farmers in general, to encrease their Hemp-fields, in expectation of the produce of their labor becoming more beneficial than they had heretofore conceived it to be ; the author having assured them, that this valuable production in several cities in France, is now, not only applied to the manufacture of Cordage, Sail Cloth, and other the like uses ; but that it is likewise become a material of cloathing, and that even the *Hards* or *Tow*, in the modern method of its preparation, being equally mixed with Wool, Cotton, Silk or Hair, is with much credit and advantage wrought into a variety of hoes, caps, stuffs, cloths, and many other articles, to the reduction of the usual price of the whole, and the consequent encrease of commerce : *Objects*, which have for many years attracted the attention of every manufactural and commercial state of Europe.

B

Great

Great part of the soils of the North American Colonies, are so well known, to be peculiarly suitable for the growth of hemp, and the mutual interest of Great Britain and those Colonies, to be evidently much dependent upon the increase of this universally useful vegetable, * that we persuade ourselves, that every sincere attempt for the encouragement thereof, must meet with the approbation of the public; and this has been our principal inducement to engage in an *Abstract* of the forementioned Treatise; in which the author appears to have "united those researches and remarks, which comprehend almost every thing that Hemp has hitherto presented to the curiosity of the learned, or the utility of the farmer and manufacturer;" though with him, we are far from thinking, he has exhausted a subject which in its nature and properties is so very extensive, and in which a great many discoveries will probably be made to the future vast emolument of the public; and this we may suppose will be more and more visible in proportion to the public encouragement which the growth and manufacture of this serviceable plant may hereafter meet with.

Without further introduction, we shall enter upon the Treatise, which our author has divided into two parts.

In the first he gives the readers the civil as well as natural history of hemp, and the various uses made of it by the ancients. In the second part, he leads him into methods of

* Hemp may be said upon the principle of its new mode of preparation, to be the most necessary produce of all others, save that of bread corn, in the new settlements of America, where sheep cannot safely be kept, as it may be applied so as to provide for one half the cloathing of the inhabitants, for the winter, and the whole for the warmer seasons; which amounts to near three quarters of their whole consumption, we mean without the purchase of any other material; the surplus of their own improvement, may be sufficient to procure what wool or cotton they may need for the other quarter.

of cultivating, dressing and manufacturing it, as formerly improved ; but more particularly acquaints him with the discoveries and experiments of modern times.

In the first part, the author informs us from *Herodotus*, the most ancient Grecian historian, that a long time before the christian aera, Hemp was cultivated in *Thrace*, as well as in *Greece*, and was improved not only in ropes, but made into fine cloths, equally beautiful with those made of flax ; and that thence we may conclude, that other nations, with whom they had any correspondence, understood the use of it also, as the *Caldeans*, *Babylonians*, *Persians*, *Egyptians* and *Hebrews*, who doubtless must have applied it to their naval service, and to the carrying on of those famous buildings, so much boasted of by antiquity, without excepting that stately *Tower* which was the first monument of the wickedness and industry of men. He likewise acquaints us from the most ancient historians of the *Romans*, that they consumed much Hemp in their land & sea service ; that they had magazines of it in some of the principal cities of the western empire, great quantities of it being by the Emperor's orders amassed at *Ravenna* in *Italy* and *Vienna* in *Gaul* : The officer who superintended that matter on the further side of the *Alps*, being called the *procurator* of hemp manufactures in *Gaul*, and had his residence in *Vienna* ; that their husbandmen used it in fixing their oxen to the yoke and other purposes of agriculture ; that their laws and their annals were written on hempen cloth ; that the use of it was very common in adorning their *Theatres*, covering their streets and public places, their amphitheatres and their *Arenae* for the *Gladiators*, to shade those who assisted at their public shews ; that the *Romans* had their table linnen of hemp, and that each guest brought his napkin with him ; whence we may infer that it was known to the ancients as a material of cloth for the common service of their families, as well as for the purposes of agriculture, shipping, &c.

After

After some further historical remarks upon the various uses of hemp among the ancients, our author descends to a very particular account of its nature and properties; but our design in this abstract being partly to render it as easy to the purchaser, as may be convenient, we shall omit what he has said as to the distinction of male and female,* and his ingenious description of the form and other qualities of the root, stem, branches, leaves and flowers, and proceed to that of the *Fruit* and *Bark*; the former of which is the produce only of the female plant: This fruit, he tells us, is terminated in forked style, when in embryo, and wrapt in a membrane which secures it till it comes to maturity; then the pistillum changing to a roundish grain, forces the membranous *capsulae*, which contain it, to open; wherein we discover a round, smooth grain, somewhat flat, and of a shining grey colour, containing, under a thin shell, a tender, sweet, and oily, white kernel, of a strong smell, that intoxicates when it is fresh. This kernel is covered with a green pellicle, terminating in a point on the side next the germ, which is very singularly situated.

This grain, which is called *Hemp-seed*, is no less useful for its peculiar qualities, than for those which it has in common with the whole plant. Its substance, considered as a seed, is soft, fat, oily, and gummy; it ferments, conceives heat, and springs up with equal facility; its pores being large, tender, and flexible, receive greedily the impressions of heat and humidity, which transmit to them the nutritious juices supplied by a fat, light, and well-laboured soil; its fibres, after a quick germination, unfold themselves, grow up, and attain strength, and the gum, being the principle

* The hemp which bears the flower (called the male) has commonly the start of that which bears the grain or seed: This superiority in the order of nature, may be well accounted for, if it be true, that the male dust which issues from the flower, serves to convey fertility to the grain on the female plant.

Treatise on HEMP.

ciple of their union, supports and preserves them. Besides the use of its oil in physick, it is employed, with great advantage, in the lamp, and in coarse painting : They give a paste made of it to hogs and horses, to fatten them ; it enters into the composition of black soap, the use of which is very common in the manufactures of stuffs and felts ; and it is also used for tanning nets.

A grain of Hemp-seed, seen by the help of a microscope, presents at first a greyish epidermis, full of veins, the compartments whereof appear like a sort of scales. Under this first cover you see a brown olive coloured bark, extremely smooth on the inside, formed of two shells, which separate exactly in the middle, like those of a nut, the seam that joins them being quite imperceptible. Under a green cover, its kernal, in the form of a little orange, bears its germ produced along one of its sides, which makes it look a little flattened : When you have taken up this pellicle, you find a white kind of matter, consisting of two lobes joined together, which evidently form a kind of head ; these lobes are very distinct, and by the germination are made to swell, open, and separate. Its germ, which is roundish, bending back along the whole external length of the grain, under the seam which joins the two shells, terminates in a point, and forms a kind of tendril, which is the only part that pierces the ground to form the root ; the other end of the germ, which lies concealed between the two lobes that enclose and preserve it, appears like an exceeding fine and delicate sort of lance ; from it issue the two leaves that appear first, and we may imagine it to be the true principle of its germination and life. These two lobes are also changed into two sorts of thick green leaves, of an oval form, but not indented, which serve for a rampart, and preservative to the springing leaves. The whole of this white matter seems to be fat and spongiuous ; and its pores appear to be no less open than those of snow : And it is, no doubt, owing

owing to the situation of its germ, and the softness of its whole substance, that Hemp-seed, beyond any other sort of grain, has so great a disposition to ferment, and spring up almost as soon as it is sown.

The bark, as it appears upon the stalk, forms a green, knotty, rough or prickly covering to it. These knots and prickles are mere excrescences of gum, of which the whole bark is composed; but they have different degrees of force and adhesion. This first superficial gum serves only to keep the fibres of the Hemp close together, and as a kind of mastic to cover, strengthen, and protect them, against the inclemency of the air, the dust, & the rain: It dissolves, exfoliates, and breaks, when the bark is watered.

The inside of the bark, which touches the stem, is smooth, soft, and white; the fibres are very distinct from one another, and appear perfectly in all their dimensions, by means, of the watering just mentioned. It was not observed in former times, that the thread had its existence in the plant, without any dependence on the operations of art; that the labour is confined to cleaning, dividing, and separating the soft fibres of which the bark is composed; and that this bark is a kind of natural ribbon, or scarf, the threads whereof are applied and joined together, lengthways, only, by a dirty glutinous humour, which must absolutely be dissolved and separated, because it is equally hurtful to the workmen and the work. The threads themselves also consist merely of a gum, but of one that is of a different quality from the superficial gum; they are supple, strong, and resist the impressions to which the former give way. Every fibre is composed of gummy globules, that are very fine, transparent, and bright, when sufficiently cleared from that superficial gum that surrounds them: and which the microscope shews to be of a different sort. All this will appear plain, if you take a few fibres from a thread that is thoroughly bleached. The fibres of
Hemp,

Hemp, in this state, are nothing different from those of cotton and silk, which makes it reasonable to consider them as materials of the same kind : And it is a convincing proof of this, that when they are mixed and carded together, there appears to be a complete sameness in the whole mixture.

We should have found, without doubt, more curious and circumstantial observations, in the generality of authors who have examined this plant, if they had been as fully persuaded of its utility in the arts, as of its medical properties.

Pliny tells us, that Hemp-seed is of a drying nature, that it weakens the generative powers in men when they eat it to excess. On the contrary, it promotes fruitfulness in fowls, for which reason it is purposely given them in winter time, and is a food to which birds are accustomed. It expels wind ; is hard of digestion ; and disagrees with the stomach ; it produces bad humours, and occasions headaches. It was formerly one of those legumes, which were fried for deserts : It was also made into little sweet cakes, to be eaten at collations, and to promote drinking ; but, at present, this unwholesome ragout is quite banished from our tables : It heats those that eat it too freely so much, that it occasions very dangerous vapours ; so that those who prescribe a decoction of this seed to children that labour under epilepsies, far from procuring them relief, increase and irritate their disorder. The juice of it, squeezed out when it is green, draws insects to it, and brings out all the vermin that enter into the ears, and infest them. Taken in an emulsion, it is good against a cough and the jaundice, and also against the gonorrhœa ; its oil is recommended as an ingredient in pomatums for the small-pox ; and it is laxative. Taken inwardly, or outwardly applied, it has not the dangerous qualities that are ascribed to the whole plant with its leaves ; the powder of it mixt with drink, will make those who
use

use it drunk, dull, and stupid : We are told that the Arabians make a sort of wine of it, which intoxicates, and poor people eat the oil of it in their soup.

The grain and the leaves being squeezed, while they are green, and applied, by way of cataplasm, to painful tumours, are reckoned to have a great power of relaxing and stupifying. The smell of it is extremely strong and intoxicating. It is pretended, that the water, in which Hemp hath been steeped, proves a deadly poison to any that drink of it : This may be true ; but what is commonly said of the same danger to fishes in the rivers and ponds, in which Hemp is watered, is false. Fishes love this plant, and fly to it ; but if any accidents of this kind should happen, they can only be owing to the smallness of some reservoirs, where the water not having a free course, may be too much impregnated with the juice of the Hemp, or afford to the fish too much of a delicious food, an excess of which is always hurtful. What Pliny assures us, of the great effect which an infusion of Hemp may have in coagulating water, will not appear surprising if we attend to the quality and quantity of the gum, which unites all the fibres of this plant together, and whereof, in reality, it intirely consists. It is, doubtless, for this reason, that it is given in drink to cattle to cure looseness. The decoction of green Hemp, with its seed, when well cleared of the dregs, causes the worms to come out of the ground on which it is poured, and the fishermen commonly make use of this expedient to catch them, when they have occasion.

Matthioli presumes, that it may also have power to drive worms out of the human body. It is given in a drink to cattle and horses troubled with a looseness ; the whole substance of the Hemp being gummy, it is by no means surprising that it should have a restraining quality ; and this is the reason why the powder of its leaves, taken in drink, is reckoned good for dysenteries, and the dust of the Hemp
itself,

itself, which the labourers draw in with their breath, when they are at work upon it, causes obstructions in their lungs, and almost always, makes them asthmatic.

The root of it boiled in water, and applied in the form of a cataplasm, softens and restores the joints of fingers or toes that are dried and shrunk. It is very good against the gout, and other humours that fall upon the nervous, muscular, and tendinous parts. It abates inflammations, dissolves tumours and hard swellings upon the joints. Beat and pounded in a mortar, with butter, when it is still fresh, it is applied to burns, which it relieves greatly when it is often renewed. The juice and decoction of it, put into the fundaments of horses, brings out the vermin that infest them.

Even the lint which is yielded by hempen cloth, especially that which comes from the sails of vessels, is very much esteemed in physic, and the ashes of these sails serve for Spodium, Lapis Calaminaris, or Tutty.

With the preceeding physical account of the grain or fruit, bark and other remarkable members of this useful vegetable, our author closes the first part of his treatise.

Having given an abstract of our Author's researches into the civil and natural history of *Hemp*, from the former part of his treatise; we are, in the next place, in pursuance of our design, from the second and most interesting part thereof, to lay before the reader an extract of what our Author appears to have had principally in view, which was, to communicate, in a very open and generous manner, the late discoveries in France, and corresponding experiments and effects, relative to a far more positable and expeditious method of preparing this important production, for the various improvements, to which it was doubtless destined in nature, than was formerly known. That we may confine this communication within the designed limits, we find ourselves obliged to pass over the well selected directions and observations of our Author, upon the choice and cultivation of

the proper soils for, and sowing, of Hemp, the weeding, pulling, saving the seed, first watering, and breaking it, (in all which our farmers have been heretofore, in some measure, instructed, and are annually gaining experience) that we may have the more room to insert the most essential parts of the experiments and effects, in the improvement of that valuable material, with the Author's pertinent remarks upon them, and the almost infinitely greater variety of applications * which it has already appeared capable of, in the modern, than in the ancient method of its preparation.—

With a particular account of the *latter*, He very prudently introduces what he designs his readers to be more especially acquainted with in the *former*, in order to set the proposed advantage, in the clearer light.

Although (as our Author says) the manufacturers have always, hitherto, preferred the Hemp which bears the flower, for the fabrication of thread and cloth, because it is naturally softer, weaker, and less loaded with gum, than that which bears the grain, it is, however, certain, that the latter is no less proper for these purposes, when it is well prepared; and for the use of rope-yards, it has a good title to the preference. It is true, that the old method of beating, swingling, and heckling the Hemp, was not in condition to produce the alteration, and the effects, which are brought about by our method of preparation. As they had not then sufficiently considered the consequences of the first watering, they did not

* Besides the use formerly made of Hemp, for cloth, thread and cordage, it was the material of many other works, for which there was a great demand, as fishing lines and nets, hunting nets and gins, pack thread, girths, ladders, bridges, helmets, bucklers, coats of mail, urns, baskets, and of later years, paper and cartoons, the consumption of which is so very large. We have much reason to believe that the impenetrability of the coats of mail, bucklers and helmets, that were formerly made of hemp prepared with vinegar, proceeded from the nature of this plant; and we experience the same effect in paper, for it is said, that a sword or a bullet cannot penetrate many folds of paper joined together.

not believe it possible that it could bear a second; and it seemed to them, that if Hemp was once wetted, it could never after be of any use.

The ancients, whom we have, hitherto, implicitly followed, and copied in all our ordinary managements of Hemp, satisfied themselves with choosing that which had been longest in the water, and weakest, for making their fine cloth; and the longest and least watered was only used for coarse ropes, or other works of that kind they imagined, that the large ribbands, which form the bark, were a kind of texture, wherein the longitudinal fibres were joined together only by a kind of little transversal ones, and that these latter must be broken to obtain the separation of the former; that there was no way to come at this separation, but by beating, rubbing, and working the Hemp. That these supposed transversal fibres yielded most easily to labour, being the weakest, and thus the longitudinal fibres only retained their length and their strength. For this end, after having bound and shaken, or swingled the Hemp, according to the customs of different countries, they put it into large mortars of wood, to be beat with wooden mallets, with an iron hoop at each end, the form and use whereof are now almost universally known.

In some places, instead of beating the Hemp, they make it pass under a mill-stone, in a mill constructed like those that are used for making oil of nuts, or Hemp-seed. This operation, which is commonly called *pounding the Hemp*, consists in pressing it every way, and by this action forcing the fibres to separate and divide, by the exfoliation of that part of the gum which joined them together. They shake the Hemp, and toss it different ways, that it may receive the various impressions of the mallet, or the mill, during this first preparation: But still this was not sufficient to qualify it for making ropes, even of the coarsest sort.

It is well known, how hard and severe this first operation is to the poor work people, who are obliged to apply to it. And how much the dust, they draw in with their breath, is prejudicial to their health, and even to their lives. Yet notwithstanding so much pain and fatigue, the Hemp requires still another operation, called heckling, which is little less noxious to them. The Heckles they use are various, with respect to their size, form, and fineness, according to the difference of countries, and the beauty of the works they are intended for ; but in all cases the method of working, and the end proposed are the same.

The business of a Heckler consists, in separating, throughout their whole length, the fibres of the Hemp, which the mill or the mallet have divided only in part. The teeth of the heckle carry off a part of the gum, which is thereby reduced to dust ; and by dressing and dividing, over again, the filaments into which they enter, separate them intirely. The oftner this operation is repeated with different sorts of heckles, coarse, fine, and finer still, the more the Hemp acquires of softness, whiteness, and fineness, whether it is intended for ropes, or to be worked into cloth.

In this manner it was the antients prepared it ; thus some prepare to this day ; and thus customs, good or bad, are continued. In this manner the Hemp prepared for cordage, still retains a hardness and a gum, that renders the ropes stiff, coarse, and not so fit for use. What is intended to be made into cloth, produces an ill coloured thread, that is coarse, loaded with gum, and such, that it cannot be used without passing through several lyes. The cloth made of it is very hard to bleached, and cannot be brought even to a very indifferent colour, till after several months of fatigue and labour.

We shall not enlarge farther upon this ancient method ; numbers of experiments since our late discovery, and the reflections they have suggested, have recovered from their
former

former prejudices, many persons as much distinguished by their rank as by their penetration, on whom popular errors make no impression. Being convinced themselves by the justness of their reasoning, as well as by the experiments they have made, they have published, supported, and defended, the goodness of our method, against the bigotry of the vulgar, who are not able, by their own sagacity, to perceive all the consequences of it. They have demonstrated, that the fibres of Hemp have as much occasion to be washed and purified from their gum, to make good thread and fine cloth, as the finest wool to be cleaned and purged of the sweat that cleaves to it, in order to be spun, and undergo the necessary preparations to its being made into fine stuffs. This is what to this present time, has been quite unknown, and is to be our principal object in the remaining part of our work.

After having long considered the various means that might be found to relieve those who work upon Hemp, and observed, in the Hemp itself, those admirable qualities, of which, hitherto, no improvement has been made, we found that the common *watering* of Hemp was nothing but the dissolution of a tenacious gum, natural to the plant, the parts whereof are joined together merely by means of it; and that, in order to this first preparation, it was sufficient to leave the Hemp in the water, in proportion to the quantity and tenacity of this gum, that after having prepared it only for being peeled, or *braked*, it seemed very proper to give it a second watering, to soften the bark. that still remains hard, elastic, and incapable of being brought to a proper degree of fineness. Accordingly, by the different experiments we made, in the presence, and under the direction of Monsieur Dodart, Intendant of Berry, we have found means, easily, and without expence, to give it those qualities that are natural to it, and the uses whereof were not hitherto known.

The

The water that has already had power to separate the bark from the stem, serves also to divide, without trouble or hazard, the fibres from one another, by a total dissolution of the gum that remains in them. For this purpose, the Hemp intended to be put into the water, is divided into small parcels; these are taken by the middle and laid double, twisting them slightly, or tying them softly with a piece of strong packthread, that so they may be stirred and managed easily without mixing.

After they have all imbibed the water, they must be put in a vessel of wood, or stone, in the same manner as thread are stowed in a lye-tub. The vessel is then filled with water, in which the Hemp is left, some days, to moisten, as far as is necessary for dissolving the gum. Three or four days are sufficient for this operation; and if one has leisure to press every parcel of Hemp, to stir it and work it often in the water, which it would be necessary also to renew, this dissolution might be attained more expeditiously, and twenty-four or thirty hours would, in that case, be sufficient for the operation.

When you see that the Hemp is sufficiently penetrated by the water, and cleared from the coarsest part of its gum, it must be taken out by single parcels, wrung, and washed in some river, to purge it, as much as possible, from the muddy and gummy water, that remains in it. After it is thus cleared, it must be beat upon a board, to divide farther the parts that may still remain too gross; then you stretch out, upon an upright piece of strong, solid wood, every single parcel of wet Hemp, after having loosed the packthread. Then you strike it lengthways, with the edge of the instrument that laundresses use for their linen, till the thick parts at the ends are sufficiently divided. The parcels must not be beat too much; for the fibres, by that means, being too much separated and weakened, will not have strength enough to stand the operations of the heckle; and

and this is a caution the necessity and consequences whereof can only be known by experience. There is even good ground to think, that by leaving the Hemp long enough in the water to obtain the division of the fibres, by the dissolution of the gum only, we might dispense with the beating it altogether; but the different qualities of Hemp would require such particular attention, that it would not be advisable to take this method. The more quickly the operation is performed, the Hemp runs the less danger; for there is some reason to believe, that, by lying too long in the water, it might have its fibres intirely dissolved, and reduced to pure gum. This observation leads to a great many remarks upon cordage, hempen cloth, and paper, which it might be tedious to insert particularly here.

After this easy labour, which, after all, is the longest that is necessary, every parcel, one after another, must be washed over again in running water, and then it will appear what success is to be expected from this method. All the fibres of the Hemp, thus beat, are divided in the water, washed, disengaged from one another, and seem to be as completely dressed as if they had already passed through the heckle. The more rapid, clear, and beautiful the water is, the more are these fibres bleached and purified. When the Hemp appears clear enough, and totally purged from its dirt and nastiness, we take it out of the water, wring it, open it, and expose it to the air, then lay it on a pole in the sun to drip and dry.

We might also use, for a second watering, the common lyes of ashes, either by making those lyes for the purpose, or taking advantage of those which are made frequently for linen-cloth. From the different experiments we have made, and the observations of many persons, who with the same assiduity have applied themselves to this matter, we have discovered, that the gum of Hemp, which has been pretty well cleared before, is by no means unfriendly to linen-cloth

cloth when it is mixed with it ; and that it will be sufficient, in such a case, to put only a layer of clean straw, about two inches thick, in the bottom of the lye-tub, in order to filtrate and purify the water, and to attract all the mud and gum that is in it. By this easy precaution, the salts of the lye, thus set at liberty, exert their whole activity upon the Hemp, or linen, which is penetrated by the water ; and it has never been observed, that it left any spot, or blemish. It will be easily imagined, that the warmth of the water, and the alkali of the ashes, must operate a dissolution much more expeditiously than can be effected by cold water ; but it will be no less necessary to beat the Hemp, that may still remain not sufficiently divided, and to wash it, at least for the last time, in clear running water, to purge it intirely from the lye water and its gum.

Besides the two methods which have already been approved and practised, in several provinces of the kingdom, we have discovered, that the operations necessary for the bleaching of Hemp may be still very much abridged. The various objections and queries, that several persons have offered upon our memorial, the execution whereof appears to them difficult and inconvenient, have obliged us to shew, that if it is not an easy matter to lay down upon paper the plainest and most simple operations, it is at least very easy to make them intelligible, by performing them, but once, in their presence. We made it appear, in several cities of Berry, that no more than two hours time is necessary to wash and bleach Hemp, in winter as well as in summer ; especially if we have the advantage of springs, the water whereof is commonly warm in the winter. In this manner we have, in about twelve hours time, produced Hemp bleached, prepared, and spun, with all the perfection it was capable of.

Heat being absolutely necessary to dissolve the gum, of which you want to clear your Hemp, it is most proper to wait till

till you have fair and mild weather, not to discourage nor distress your workmen, who will think that a hard work, which will oblige them constantly to put their hands in cold icy water, or perhaps, for that reason, neglect some of the operations essentially necessary, in order to success.

Thus, those who would expeditiously make experiments upon two or three pounds of Hemp, may divide them into several little parcels of three ounces each, or thereabouts. These they are put into a proper quantity of water, as hot as they can bear their hand in it. There they are to leave them to moisten and souple about half an hour; then take out each parcel by itself, wring it, dip it, squeeze it, and work it in the water, as laundresses do linen cloaths, when they have soaped them, so as to prevent their mixing together, and being hurtful to one another. After this first operation, the water, being dirty, thick, and loaded with gum, must be thrown away. You must then take a second water, as hot as the former, in which the Hemp must be worked as before; then a third, until the Hemp appears to be clear enough. After these three bathings, if any ribbands of bark still remain that are too broad, or not enough divided, you must take the instrument and beat them moderately, to procure a further division.

This operation being compleated, you must bring your Hemp to some river, and wash it in the stream, which will then carry away all the rest of the gum. In this manner, the fibres of the Hemp, like so many threads of silk, are disengaged, divided, purified, refined, and whitened; because the gum, which is the sole principle of their union, is also the cause of their nastiness, and of the different colours to be seen on Hemp; finally, take it out of the water to drip and dry, as has been said above.

When the Hemp is dry enough, it must be doubled with caution, twisting it, at the same time, slightly, to keep the threads from mixing together, and thus it is given

to the Hemp-dresser, to prepare it for spinning. It will not be necessary to beat it so long as before. This work, formerly so hard on account of the strength it required, and so dangerous on account of the fatal dust the workman drew in with his breath, will be, henceforth, only a business moderately severe. There will be no occasion to look for machines to save the labour of men, and prevent the dangers attending the work. The business of a hemp-dresser, henceforward, would be confined to an easy beating of the Hemp, and the common operations of the heckle; it is so much the more easy, that the materials are foster, and no longer exhale unwholsome dust; and moreover, there is scarce any waste in this operation. The second beating serves only to divide a second time the fibres of the Hemp that re-unite in drying, and this renders it white, smooth, flexible, soft, and fit to receive all the preparations of the heckle. If you want it to pass through the finest heckle, the Hemp, thus washed, will afford dressed stuff capable of producing the best thread, comparable to what is yielded by the finest flax, and you will have little more than a third of very good hards.

Now this hards, that was formerly an object of discouragement, sold commonly to rope-makers for about five farthings the pound; by this new operation becomes a matter of very great advantage. By carding them like wool, they produce a fine, marrowy, and white substance, the true use whereof was never discovered till now. It may not only be used alone, as it is, for making of wadding, which, in many respects, will have the advantage of the ordinary sort; but, moreover, it may be spun, and made into very beautiful thread. It may be also mixed with cotton and silk, with wool, and even with hair; and the thread, that results from these different mixtures, affords, by its vast variety, materials for new essays, very interesting to the arts, and of vast utility to several sorts of manufactures.

The

The Hemp thus prepared, may be also dyed like silk, wool, or raw cotton, either red, blue, yellow, &c. or other colours, suitable to the uses intended to be made of it. It will receive and retain, with great ease, the tinctures that are given it, in order to be made into stuffs, cloth, stockings, and garments of all kinds; or even into tapestries, embroideries, and other sorts of furniture.

The principal advantage that Hemp, intended for these uses, will have over wool, grogram yarn, and cotton, is, that it may be used without spinning, or even combing. It will be in no danger from those worms, which commonly eat woollen cloth; and the beauty, as well as the lasting nature and low price of it, will render it preferable to any other material. The different trials, that have been made of this sort, leave no room to doubt of success in other attempts of the kind.

Mixtures that may be made with Hemp, will be the more valuable, as they will lessen, more than one half, the price of the most expensive and uncommon materials, with which its hard parts are incorporated. In a word, we shall have the advantage and satisfaction of finding in a plant, which grows commonly among us, the means of indemnifying ourselves for a part of those productions which we are obliged to fetch, every day, from foreign and very distant countries, or even of dispensing with them altogether.

We have already given, in several cities of the kingdom, such samples of these mixtures, as have been demanded of us, that the first sight of them has excited the surprize, and merited the approbation of the best judges.

We have not yet exhausted all the combinations which may multiply the use of Hemp, in its different forms. The cloth that is made of Hemp, thus prepared, will not be so long in bleaching, and even the thread will not have occasion to pass through so many lyes as were formerly found necessary. The sails of ships will not be so stiff and hea-

vy, the ropes will be found more flexible and strong, and move with more ease and expedition.

These first discoveries have led us to think, that even the waste, the coarsest dressings of the Hemp, and the sweepings of the shops where it is prepared, contain something valuable, which, in former times, was either thrown into the fire, or upon the dunghill, because its use was not known. Yet after all, it wants only to be beat, cleaned, and purified by water, in order to be of excellent service in paper manufacturies. The experience we have had of this, shews evidently, that it might be made a matter of great importance.

After the particular account we have given of the nature and properties of Hemp, we doubt not but the people of the country will avail themselves of all the advantages they may attain by the practice of these new methods. If they apply themselves to the cultivation of Hemp, and carry to perfection the methods of preparing it, what resources will they not find, in employments so profitable, and at the same time so easy? For to consider only its common qualities, it must be acknowledged, that it is a commodity absolutely necessary. The use of it extends to almost all the purposes of commerce and of life. There is no state nor condition that can be without it. The very person who cultivates it, is the first to make use of it for cloathing; and of all his labours, this is often the only fruit which he retains. He cultivates it through necessity, and through necessity he keeps it. There is a singular kind of circulation in this commodity; nothing that bears a near resemblance to it is to be found in the other productions of life. The more it is used, the more the cultivation must increase; and the more you cultivate it, the more you increase its consumption. The cultivation alone is a labour that requires inhabitants, and the consumption of it serves to maintain them. In the different methods of preparing it, young
men

men and women, old men and children, find employment, in proportion to their strength and ability. Some find business in preparing the ground, and sowing it; others pull the Hemp, and water-brake it; others make ropes or cloth; all of them join in the consumption, and make use of it; and every one jointly and severally contributes to renew their own work, while they are relieving their wants.

The manufacture of Hemp, then, is one that is naturally suited to the country; as it is necessary to all, it should spread every where. The manufacturer, in the proper season, becomes cultivator, with all his family, in his turn, becomes manufacturer, as soon as he has finished his harvest. Then the different preparations which Hemp requires, give him an opportunity to avail himself of the time wherein, on account of the severity or inconstancy of the weather, he would have otherwise nothing to do.

To what the author has said, of both the antient and modern method of preparing Hemp, and of the vast variety of the different combinations, of which it is proved not only capable, but is now actually applied to, (as has been said) in several provinces of France, to their great emolument, we apprehend little necessity of making any addition: Nevertheless, we can't avoid improving the singular encouragement thence evidently derived to the inhabitants of America, to engage in the latter method as they are assured by this means of encreasing the staple of coarse cloathing, the Hemp being equally mixed with wool, cotton or hair; and if, as the author affirms, it be found capable of being so combined with those materials, and even with silk, as not to be discriminated in the mixture, by reason of the acquired division and consequent softness of its fibres, which the new method of operation endows it with, surely the Colonists will not pretend that they stand in need of bounties to induce them, as their growth and other circumstances will admit, to cultivate the many
proper

proper soils which nature has so plentifully furnished them with for the production of this useful plant, to which in so many serviceable respects, no other bears any tolerable proportion: however, as we have the additional inducement of a parliamentary bounty, extended to near twenty years to come, we may flatter ourselves that these colonies will not loose sight of objects which afford such advantageous prospects to their mother country as well as themselves; but on the contrary, that they will vie with each other, in the most general and perfect cultivation of this and its * sister branch of the art of agriculture, that so respectable quantities of each of them, may after a few years, be annually shipped to Great-Britain upon the offered bounties.

The proposed method of preparing Hemp, has been examined by several different manufacturers, who appear in some measure to realize the truth of the asserted effects, from what they have observed of the nature and properties of that material. One of the most experienced of them assures us, that some of the softest and best Hemp he had manufactured into cordage, was what he purchased from the grower of it in this province, after being very thoroughly soaked in river water, into which the whole was turned by an accident, as the owner was transporting it to market; that when the Hemp was well dried, tho' very full of shivers, which at home the owner had been unable to clear it of, by a slight beating and shaking they were easily seperated, and the Hemp in better order to work up than any the manufacturer had by him, which he very justly attributed to the undesigned second watering; the natural gum being thereby dissolved. This may deserve the attention of those who are much concerned in navigation, as possibly the strength and durableness of cordage in general may be much promoted by a similar practice.

* Flax.

practice. It has been said by some that a rope made of well prepared Hemp, tarred, or white, of five inches, may probably bear a strain or weight at least equal to one of six inches, made of the like Hemp, as commonly prepared, and more durable, supposing the continued service of each to be equal.—The strength and durableness of the former, we may venture to ascribe to the more close and perfect union of the fibres in spinning of the yarn, the combination of it in the strands, and of these in the completion of the rope. As strength is the natural effect of union, so the more intimate the *one* is, the more increased will be the other. If gum be a natural property of Hemp, reason as well as experience teaches us, that this necessary union cannot be obtained, without the dissolution of the gum, or some other method of discharge: but whether it should be any way discharged, in order to the Hemp being wrought into common cordage, is submitted to the judgment of the manufacturers. We would nevertheless recommend to the makers of white ropes, fishing lines, spinners of shoe thread and twine, and any other article wherein a division of the fibres is requisite, to soften their Hemp by water, as it will much abate of the labor, risque and loss, which attends the usual method of beating and heckling it without previous watering, much of the fine staple being in this way reduced to tow, while the required division and softening of the fibres, aimed at, in the use of the beate is not obtained, for want of a dissolution of the gum*. It is probable this want of softness

* The division and consequent softness of the fibres of Hemp thro' the operation of water, we know not how more familiarly to communicate to farmers in general than by putting them upon a careful examination of the ends of their hempen cart ropes, when opened several inches from the extremity; the silken fibres of which afford a clear proof of the effect of frequent watering, and so of the truth of the general doctrine advanced by our author respecting the necessity of water in cleansing, dividing and duly softening those fibres.

ness in Hemp, may have been a principal reason why canvas in Russia, as well as Great-Britain, has been so commonly made of Russia flax, that material being naturally more soft, and less loaded with gum, than the other, and therefore more easily manufactured: but should the practice in *France* of watering their Hemp, be adopted in those countries, it would doubtless become the staple of that important manufacture.

We find the Hemp-growers frequently complaining of the want of a market for their Hemp, tho' at a much lower rate, than it cost the merchant of late to import it from Great-Britain, all charges included. We hope this discouragement of the *farmer*, when duly considered of, by the able purchasers, will be removed, by their public offer of a reasonable price, for whatever merchantable Hemp he may have by him, or in a limited time produce for a market. This we need not say, would not only save money in the purchasers pocket, but may likewise greatly tend to promote the growth of Hemp, and gradually to lessen the importation of that which is of foreign growth, into Great-Britain and her Colonies, to the encreasing emolument of both.

' We would propose further for the farmer's benefit, that if he has at any time by him Hemp, for which there is no present demand at a reasonable price, he goes into the method of watering it, to prepare it for the heckle, by which having well seperated it from the tow, he may probably obtain a more ready and profitable market for the tier or long staple of the Hemp (the labor and waste of stuff being allowed for) than he could have had for his rough Hemp; the tow, being but little more than one third part of the whole, when carefully seperated from Hemp duly prepared, will remain in his hands, as a useful material

material of coarse clothing*: Moreover, we are of opinion, that the farmers sending to market his long well-dressed staple may be more agreeable to the manufactures of whale, warp, white ropes, liness, &c. than his rough Hemp of which they have so frequently complained. The farmers might in this way find a full employ for himself and family during the winter season, in which but little is earned by most of them, who are not at all, or but poorly provided, with the materials of their cloathing, among which it's probable, that Hemp may be hereafter esteemed of as much importance as any other†: and for this reason we would hope that many thoughtful persons will be induced to experiment some of the various applications of the well softned hards or tow of Hemp, agreeable to the directions and hints of our author in the foregoing abstract; as their success might greatly promote its production, as well as the singular advantage of the experimenters.

As the *British nation* in general is so remarkable for readily copying many of the fashions of *France*, we may hope, there will be no objection started by *British Americans* against an imitation of so profitable a mode of preparing *Hemp*, thus happily communicated to them, from the experience of that nation: if any should arise, we hope to remove or abate the force of it by the following remarks, which our author has seen fit to subjoin, near the close of his Treatise, and with which, it may be proper to close our Abstract thereof, and observations upon the singular usefulness and utility of its subject.

E

“ In

* An increase of the materials of coarse clothing is a sure means of augmenting the population and riches of a country.

§ Fishing lines made of the long staple of well softened Hemp, appear of a more firm and durable contexture, than any other.

† The manufacture of which there is the greatest Demand, according to the principles of the Dutch, ought always to be encouraged in preference of any other. They are not so fond of great perfection, as of great consumption. *Marcand.*

" In Hemp duly prepared, our author remarks, that besides silk, hair, wool and cotton, we find a new material which till now, had never any existence in commerce, nor in manufactures, but may be made extremely useful in both. By mixing it with wool, for instance, half and half, we work it into caps and cloths, which are no ways different from those that are made of wool alone, in their greatest perfection. By mixing the hards of it with cotton, we make cloths and stuffs, and even coverlids, which with regard to whiteness, softness, fineness, and other qualities, may be preferred to those, which, at first, we only propose to imitate. *

There is no question, but thread made of such hards, would perfectly suit wax and tallow chandlers for wicks, &c. Nor is it to be doubted, but it may also be employed in manufactures of hats, as it will be an easy matter to make felts of it, if mixt with wool proper for that purpose. We may also make it into hunting waistcoats, and waistcoats for the army, breeches, hunting bags, carpets for gaming and writing tables, and many other works generally made of leather, and very expensive.

In a word, by the different combinations made with the hards of Hemp, they assume the nature and properties of the materials, with which they are mixed, and the price of such materials will be lessened in proportion, as they are now dear, uncommon and rare.

We

* From some further experiments made among us, since these sheets were in the press, it appears that the well bleaching of the *hards* or *tow*, as far as is consistent with the strength of its staple, is the sure means of obtaining the desired mixture with foreign materials, either by well combing or carding them together, that is, by combing the well bleached long staple of the Hemp, with wool, and by carding the well bleached tow with cotton, which it is presumed is the meaning of the author in the paragraph to which this refers.

We shall not at present, be more particular upon this subject; these observations being in our hands only, will be always confined and imperfect; but the ideas we have suggested, may easily receive a better form, and be carried further by the knowledge and experience of others. All that we can assure our readers, is, that by introducing into trade and manufactures, as a fifth material, prepared Hemp, which may be considered as a new creation, we shall not only add a fifth to the four that have been long known; but, to use a *mathematical expression*, we shall by this means raise each of them, far above the *fifth power*."





Of the Use of the *Horse-Chestnut*.

MONSIEUR *Marcandier*, at the end of his Treatise, of which the foregoing is an Abstract, has obliged his readers with his discovery and consequent experiments of the fruit, called in *France*, the *Horse-Chestnut*.

This fruit he tells us abounds with astringent, aluminous, deterfive, lixivial and saponacious juices, the use whereof might be very advantageous to mankind in *Physick*, as well as in the improvement of *the arts*: especially in the latter, in respect of which, he tells us, that twenty of the chestnut, being peeled, and rasped into some river or rain water, the juices will be in ten or twelve days, sufficiently extracted, to impregnate about 5 or 6 gallons of water, and so in proportion, to wash, clean, and bleach Hemp stuffs or cloth.

In order to make use of it, the water must be heated, till you cannot bear your hand in it. If you cannot absolutely dispense with soap, less than usual will do; rubbing with it only those parts of the stuff, where the dirt is most tenacious, as the expense to those who are obliged every day to use soap, as laundresses and fullers of stockings or stuffs, is very great.

The Author says, that he has had stockings and woollen caps fulled with Horse-Chestnut water only, which have perfectly taken the dye; that he has had the like success in stuffs fulled in a mill, and that a vast number of experiments of the like kind, have been performed in the presence of the Author and other persons in several towns of Berry to their entire satisfaction; that he has particularly proved the usefulness of Horse-Chestnut water by putting Hemp into it to steep and macerate for some days, that after being slightly rubbed in it, the fibres of the Hemp were divided, softened, and became much whiter than those which had been washed only in pure water: the activity of salts and oil contained in that fruit carrying off entirely from the Hemp, the gum which most obstinately adhered to it, and what could not be totally dissolved, was forced to exfoliate.

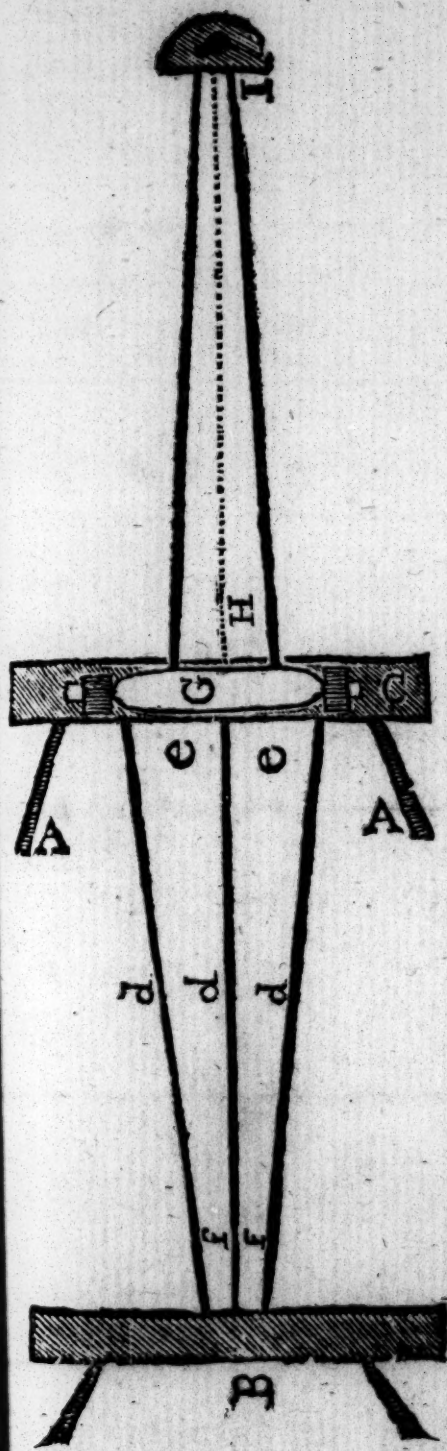
The Author further remarks, that should a quantity of these chestnuts be wanted for use, the labor may be abridged and rendered more simple, which may be done, by grinding them, in a mill, after being dried and peeled, and if they are not dried enough, they may be formed into a paste, which will easily dissolve in water.

He adds, that it has been proved by experience, that the Horse-Chestnut water is used with success instead of soap, for scouring cloth, after having loosed the dirt with fulers earth, as practised in manufactories and fulling mills. For this purpose, you are to put into the vessel a quantity of Horse-Chestnut water sufficient to moisten and foment the cloth which you wanted to be fulled. This water should have a proportionable degree of heat, and care must be taken to renew it as often as it shall be found necessary.

If

If to this publication of the properties and improvement of the Horse-Chestnut, it should be objected, that the tree is not of American growth: it may be said, that as some of the Colonies are in near the same latitude with France, it is possible that in some of them, it may be discovered, if not, without doubt it may be propagated, as extensively as may be needful, from a few trees already in the country, and from the nuts which may be easily imported. If this should be said to be a work of time, so have been most other attempts of the like kind, which have eventually proved of important service to this as well as other countries. While we are in want of the Horse-Chestnut, we would recommend to the curious to make experiments upon the acorn of the red, white or any other species of oak, of an astringent quality, which may probably serve the same purpose with the Horse-Chestnut; the improvement of which, being thus divulged, may, and we hope will, excite the curiosity of many, to examine not only into the nature and properties of the fruit or grain of the oak, but of any other vegetable possessed of any qualities similar to those of the Horse-Chestnut, as they have been described.





E X P L A N A T I O N.

- A The feet of the Brake, about the height of a Flax Brake.
- B The lower part of the Brake, a piece of timber, 4 inches square.
- C The lower part of the foot of the Brake, a piece of timber, 5 inches square.
- d The lower slats ——— 5 $\frac{1}{2}$ feet long, and 5 inches broad.
- e Eight inches between each slat.
- f Almost close, leaving room for the slat at I to fall in.
- G A piece in form of a rowler, by which the upper slats work on the lower.
- H The upper part of the head which when used, falls on the lower part at B.
- I The dotted mark from H to I is a handle running above the Brake, so that the laborer may take hold of any part of it.

With this Brake, the laborer without laying the Hemp out of his hand, is able to rough-brake and crackle, in the hinder part of the Brake, and clean and finish in the fore part, if used to the business, 100 pounds in a day, fit for the market. — Since this plan of a Brake was in use in Pennsylvania, we are informed, that every other machine is disused; and we hope it may add to the encouragement which is already afforded to the hemp grower.

